for him to win if he ordinarily is?" The affirmative answer does, indeed, "draw cheques on the universe which it has never yet honoured." The negative answer and how to secure it the reader will find in Mr. Robinson's pages.

APPLICATIONS OF COAL-TAR DYES.

Modern Dyeing Methods: The Application of the Coal-tar Dyestuffs: The Principles Involved and the Methods Employed. By C. M. Whittaker. Pp. xi+214. (London: Baillière, Tindall, and Cox, 1918.) Price 7*s.* 6*d.* net.

THIS is one of a series of eighteen volumes (published or in course of preparation) edited by Dr. Samuel Rideal, and intended to give a comprehensive survey of the chemical industries, as set forth in the general preface which precedes that of the author. It cannot be said that the author has followed this well-conceived plan so conscientiously as he might have done; in fact, the only point to which he has rigidly adhered has been the subdivision of his subject into sections. We are promised in the general preface that "there will be a general bibliography, and also a select bibliography to follow each section." Such bibliographies (coupled with references to current literature) would have represented a most valuable adjunct to a small work such as this, in which the treatment of so vast a subject is attempted, but all that is given (except a few references in the text) is a very incomplete list of works and current publications on pp. 10 and 11, while no select bibliographies follow the sections. The scope of the work is, however, ill-defined, for it bears no fewer than three titles, namely, Modern Dyeing Methods, The Application of the Coal-tar Dyestuffs (both on the title-page), and Dyeing with Coal-tar Dyestuffs (on the cover); strictly speaking, each of these subjects would require different bibliographies. The second heading is, however, the one under which the book is advertised in the general list, and one would certainly have expected the textile printing, lake-manufacturing, and paper-making industries to receive due consideration, but the two former are ruled out for lack of space, while the third is only cursorily mentioned in one or two places.

The dyestuffs are correctly subdivided under the various sections according to their mode of application in dyeing, and not according to their chemical constitution. Their application in the dyeing of the various classes of textile fabrics is generally adequately described, and many practical hints are given which may prove useful to the dyer. But, apart from inaccuracies, there is a certain looseness in the style which may in some cases lead to confusion. In some sections the author gives (*e.g.* on p. 12) a list of the principal classes of compounds from a chemical point of view, with a typical example of each. Thus the triphenylmethane dyestuffs are represented by magenta (the formula given is actually that of *p*-rosaniline hydrochloride, but this is of minor consequence); while on p. 13 the azo-dyes of basic character are typified by Bismarck brown (with an incorrect formula), but there is nothing to indicate that these are only typical examples. The grouping of the acid dyestuffs on p. 28 is a little clearer, but still requires some further explanation, and the same applies to the artificial mordant dyestuffs on p. 40. In the three later sections dealing with the direct cotton dyestuffs, the insoluble azo-colours, and the eosines respectively, no examples at all are given. Not only do we find such inconsistencies, but there is also displayed in many cases a lack of the sense of proportion. Thus, while on p. 19 particulars are given of two methods (*a* and *b*) of applying basic colours in cotton-dyeing, which are seldom, if ever, used to-day, the direct method, which is very useful for light shades, and ensures good penetration and level dyeing, is not even mentioned.

The last section is devoted to the valuation and detection of dyestuffs, but it is very inadequately handled. No mention is made of any of the exact quantitative methods of estimating dyestuffs which are in use at the present time, while with regard to the identification of dyestuffs on dyed fabrics the author, after referring the reader to Prof. A. G. Green's excellent work on the subject, contents himself with giving a few practical hints or tips, including two for the detection of "faked" indigo.

Altogether, the work is disappointing, and adds little, if anything, to our present knowledge of the subject.

THE MEASUREMENT OF TEMPERATURE.

Methods of Measuring Temperature. By Dr. Ezer Griffiths. With an Introduction by Principal E. H. Griffiths. Pp. xi+176. (London: Charles Griffin and Co., Ltd., 1918.) Price 8*s.* 6*d.* net.

IT is a pleasant task to welcome this work by Dr. Ezer Griffiths, of the Heat Department of the National Physical Laboratory. During the last few years it has been necessary to refer to text-books written by our Allies rather than to works written by British men of science when general information on temperature measurement is required. This has been particularly unfortunate, as so much of the fundamental work in thermometry is due to Englishmen.

Principal E. H. Griffiths, in an interesting introductory reminiscence, points out the great advances that have been made in the subject during the last thirty years. He states that "our knowledge of the temperature scale about 1600° C. is comparable both in facility and accuracy with our measurements some thirty years ago in the neighbourhood of 600° C." That this is no exaggeration a glance at the chapters on "The Fundamental Scale of Temperature" and "High-temperature Melting-points" will show. In the former chapter Dr. Ezer Griffiths summarises the work done in gas thermometry, the most difficult of all thermometry. He points out that the dis-

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covery of the monatomic gases with no chemical affinity has made available elements which approach the "ideal gas" nearer than hydrogen or nitrogen. Argon will probably be employed in all the higher temperature gas thermometry because it does not diffuse readily through quartz.

In the chapter on the mercurial thermometer some useful information is given as to the construction of the electrically heated testing baths now in use at the National Physical Laboratory; indeed, one of the not least valuable features of the book consists in the data and illustrations given of the thermometer and pyrometer testing equipments of this laboratory.

The chapters on the resistance thermometer and the thermo-couple show that a great deal of experimental work has been devoted to developing the precision of the results obtained with these instruments. It is to be regretted that the author has not been able to deal more fully with their commercial development. We notice the omission of Peake's compensating leads and the very brief mention of the modern recording instruments, base metal thermo-couples, etc.

Four interesting chapters are devoted to the study of radiation and optical pyrometers and the problems connected with them. From the scientific, as well as from the industrial, point of view, the measurement of very high temperatures is of great interest. The instruments in themselves are comparatively simple, but the extrapolation of their scales beyond 1400° C. is a problem of considerable difficulty. A large number of workers will be grateful to Dr. Ezer Griffiths for the concise summary of the work on which this extrapolation is based.

In connection with the explanation of the Wanner optical pyrometer, it should be pointed out that the images of the illuminated patches are circular (being images of the circular diaphragm), and not semi-circular, as stated. The description of the instrument on p. 120 is not so accurately worded as it should be. The diagram is not well printed, and is thus difficult to understand.

A useful bibliography is given at the end of each chapter. A small slip on p. 55 may be mentioned; for Tables xlix. and l., xlvii. and xlviii. should be substituted.

The book is a useful, short summary of the subject, and, although not so complete as one would have desired, may be recommended as an addition to the library of every physics laboratory.

OUR BOOKSHELF.

Biology of Sex for Parents and Teachers. By Dr. T. W. Galloway. Pp. 128. (London: D. C. Heath and Co., n.d.) Price 2*s.* net.

CONVINCED of the need for sex-instruction, Dr. Galloway seeks to give parents and teachers some idea of the biological and ethical principles which should underlie it, and to suggest the spirit in which it should be attempted. He has sympathy with endeavouring by knowledge to avoid disaster, but he sees positive promise in trying to use the sex impulses and instincts educatively. He seeks to present the facts of sex in their broad biological and evolutionary setting, and the lines of instruction suggested seem to us to be shrewd and wise. He would in a graduated and differential way explain to young people that if their sex-development goes awry, the results will show themselves in reducing the efficiency of body and mind. "The purpose of sex-knowledge is to enable you to let yourself develop normally without giving the matter any unnecessary thought." But the power of control over impulses requires strengthening even in the strongest, and the author writes in an experienced, practical way of the ideas and ideals, habits and interrelations that make it less difficult to "keep the heart with all diligence."

Emphasis is wisely laid on the importance of grading the instruction according to intellectual and emotional development and the diversity of social and economic relations. The linking of sex-instruction to biology and hygiene on one hand, and to ethics and eugenics on the other, is a good feature of a concise and clearly written book which can be confidently recommended to parents and teachers. Now and again we have come across a sentence that jars (*e.g.* on p. 119: "Because of this shell, chickens cannot behave like fish in fertilising the egg"), but the workmanship of the book is thoroughly competent.

The Processes of History. By Prof. F. J. Teggart. Pp. ix+162. (New Haven: Yale University Press; London: Humphrey Milford, 1918.) Price 5*s.* 6*d.* net.

THE main argument of this essay is that historians should take into account the natural processes that have moulded human groups, and that the history of no one area can be viewed independently of that of its neighbours. A powerful plea is put forward for the recognition of a history of Eurasia, in which Western events may be treated as the outcome of climatic and other incentives to movement in the broad lands lying to the East. The author urges that Lyellian methods cannot be applied to history, though correct inferences from historic data "should be verifiable by application to things as they are." Our range of view, in seeking for causes of human action, cannot be restricted by epochs and localities, and the dominance of mere narrative in history seems already overthrown. Prof. Teggart regards primitive man as engaged in maintaining a system of life which he has found sufficiently advantageous. In thus minimising the influence of the gifted and ingenious member of the tribe, or of the hunter whose adventurous outlook has brought him into open country from the confining darkness of the woods, he strikes a blow at the theory of leadership as a cause of rapid change and evolution. Tribal movements appear to him to originate in some broad change of condition, and the migration thus enforced by Nature leads to development by collision with men who have followed other modes of life. The book will perhaps be of service in pointing out the problems rather than the methods of modern history.

G. A. J. C.

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